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SHIP PRODUCTION COMMITTEE
FACILITIES AND ENVIRONMENTAL EFFECTS
SURFACE PREPARATION AND COATINGS
DESIGN/PRODUCTION INTEGRATION
HUMAN RESOURCE INNOVATION
MARINE INDUSTRY STANDARDS
WELDING
INDUSTRIAL ENGINEERING
EDUCATION AND TRAINING

THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Proceedings of the REAPS Technical Symposium

Paper No. 26: An Overview of the Manual and the Computerized "MOST" Work Measurement Systems

U.S. DEPARTMENT OF THE NAVY CARDEROCK DIVISION, NAVAL SURFACE WARFARE CENTER

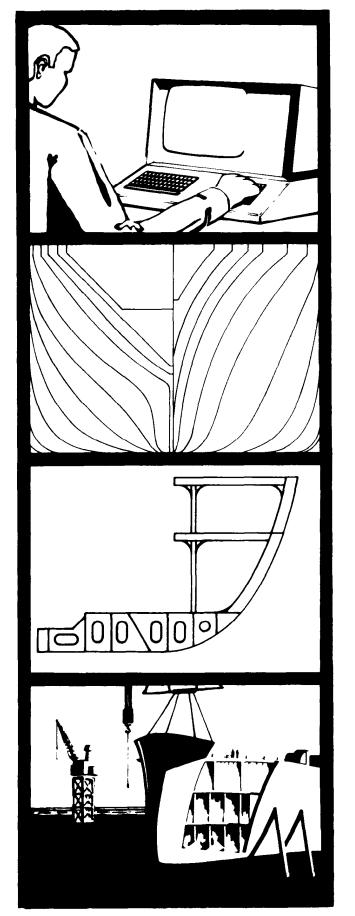
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R ESEARCH
AND
NGINEERING
FOR
A UTOMATION
AND
P RODUCTIVITY
IN
HIPBUILDING

Proceedings of the
REAPS Technical Symposium
October 14-16, 1980
Philadelphia, Pennsylvania

AN OVERVIEW OF THE MANUAL AND THE COMPUTER "MOST" WORK MEASUREMENT SYSTEMS

William M Yates Jr Sales Coordinator H. B. Maynard and Company Inc Pittsburgh, Pennsylvania

Mr. Yates has the responsibility for the administration of all company sales information and reports. He aids the sales staff with computer systems configuration and proposal preparation. He also provides presentations and demonstrations of H. B. Maynard and Company services to potential clients as well as interested professional organizations.

Mr. Yates holds a degree in administration from the University of Pittsburgh, and 'is a graduate of Carnegie-Mellon University.

MOST COMPUTER SYSTEMS

A NEW AUTOMATED

SYSTEM FOR THE ESTABLISHMENT AND

MAINTENANCE OF ENGINEERED LABOR TIME STANDARDS

H. B. MAYNARD and COMPANY, INC.

INTERNATIONAL MANAGEMENT CONSULTANTS

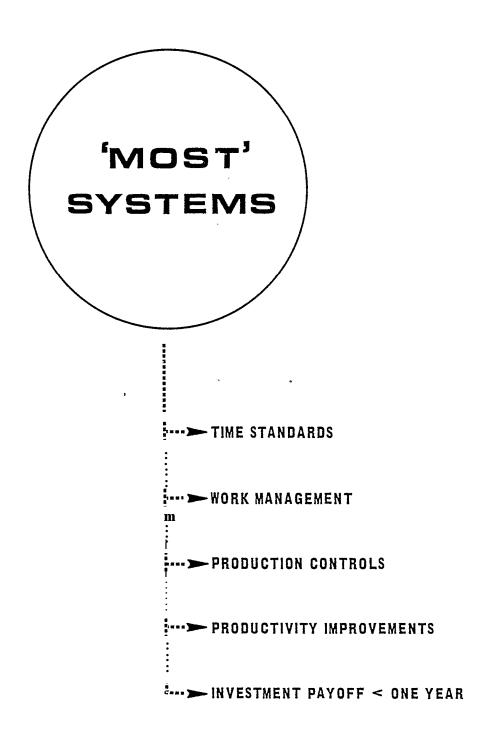


WHY DO WE NEED LABOR TIME STANDARDS?

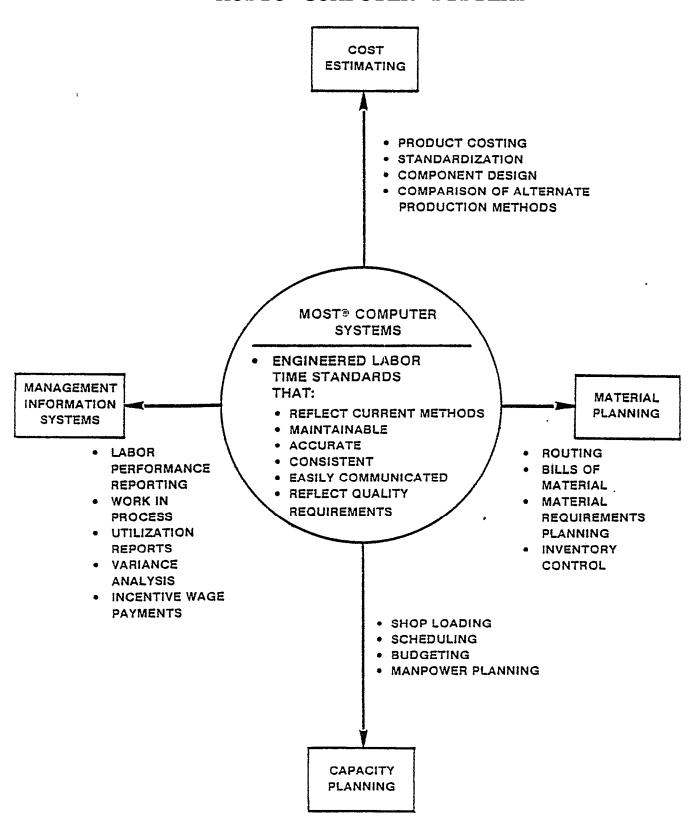
- SATISFY A BASIC HUMAN CHARACTERISTIC (THE NEED TO KNOW WHAT IS EXPECTED FROM A PERSON)
- PLAN AND SCHEDULE LABOR REGARDING TIME AND MANPOWER
- CONTROL OUTPUT AND PRODUCTIVITY
- CALCULATE PRODUCT AND LABOR COSTS
- PAY BY RESULTS

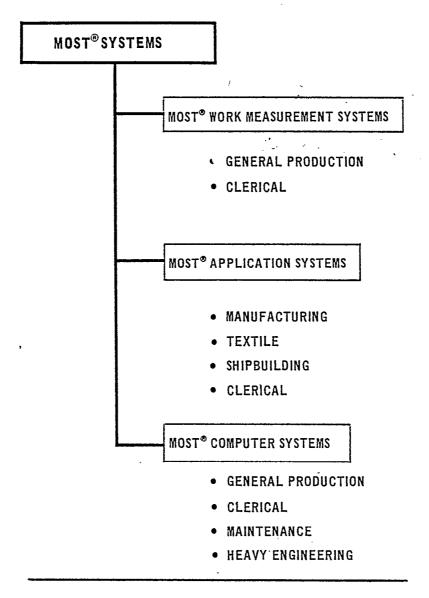
WHAT IS REQUIRED TO CALCULATE AN ENGINEERED TIME STANDARD?

- 1 DOCUMENTATION OF WORK CONDITIONS
- 2 WORK MEASUREMENT TECHNIQUE (MOST)
- SUB-OPERATION DATA DEVELOPMENT
 PRINCIPLES AND RULES
- FILING SYSTEM FOR SUB-OPERATION DATA
- 5 CALCULATION FORMATS FOR FINAL TIME STANDARDS



MOST® COMPUTER SYSTEMS





MOST SYSTEMS FAMILY

'MOST' FEATURES

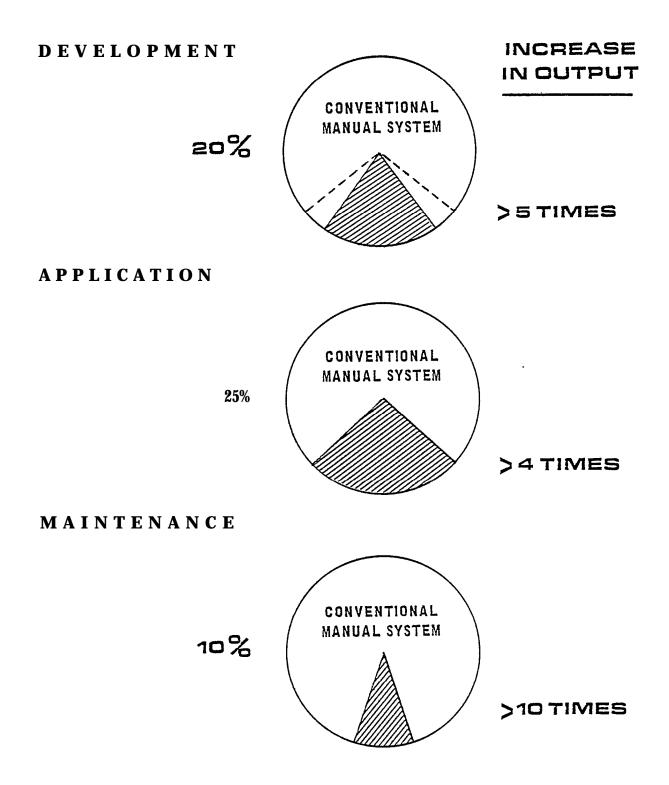
- UNIVERSAL APPROACH
- FAST TO APPLY
- ADEQUATE ACCURACY
- EASY TO UNDERSTAND AND LEARN
- MINIMUM OF PAPERWORK
- MULTILEVEL SYSTEM
- CONSISTENT RESULTS
- ENCOURAGE METHODS DEVELOPMENT
- OPEN TO SUPPLEMENTS
- ECONOMIC INSTALLATION

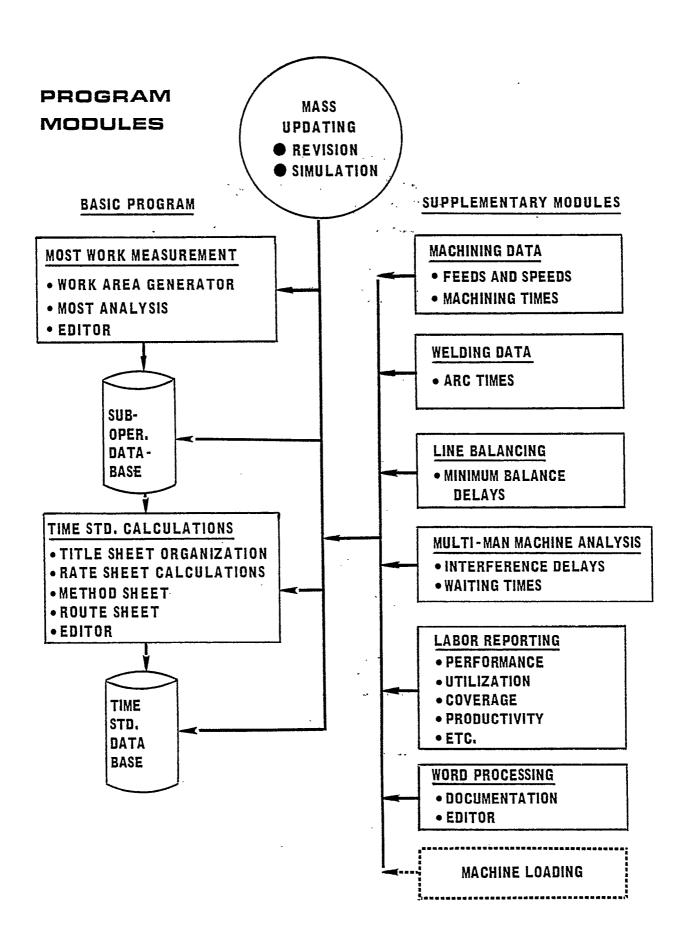
MOST COMPUTER SYSTEMS

WILL -

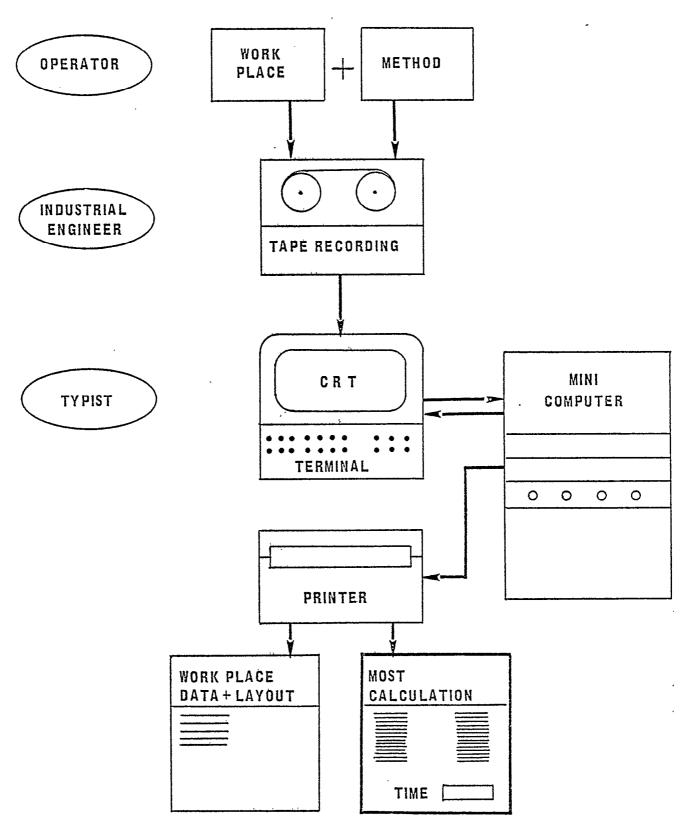
- SIMPLIFY AND ACCELERATE THE DEVELOPMENT AND MAINTENANCE OF TIME STANDARDS
- IMPROVE THE PRODUCTIVITY OF THE INDUSTRIAL ENGINEER
- MAKE THE INDUSTRIAL ENGINEER'S JOB MORE CHALLENGING AND STIMULATING
- GENERATE UNIFORM INFORMATION AND DATA FOR FASTER AND MORE CONSISTENT PRODUCTION PLANNING AND CONTROL
- INCREASE THE SAVINGS/COST RATIO FOR THE INDUSTRIAL ENGINEERING FUNCTION AND THE PROFITABILITY FOR THE COMPANY

REDUCED MANPOWER REQUIREMENTS FOR:



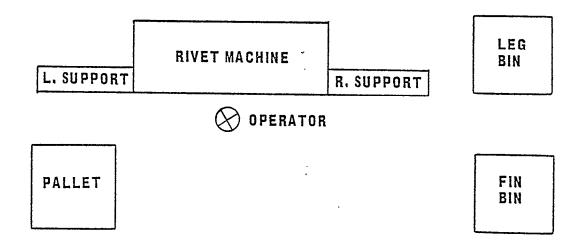


BASIC DATA ENTRY



ANALYSIS EXAMPLE

WORKPLACE: RIVET MACHINE



WORK STATIONS:

RIVET MACHINE	12/6, 6/3	RIVET MACHINE - PT = 5 SEC.
LEFT SUPPORT	8/6, 4/1	
RIGHT SUPPORT	16/6, 4/1	
PALLET/BEND	8/2, 4/4	TOOLS:
LEG BIN	22/6, 4/4	
FIN BIN	22/2, 4/4	NONE

OPERATOR 15/6

ACTION DISTANCES:

FIN BIN - PALLET	3	STEPS
FIN BIN - R. SUPPORT	2	
FIN BIN - L. SUPPORT	2	
FIN BIN - RIVET MACH,	2	
FIN BIN - LEG BIN	2	
PALLET - R. SUPPORT	2	
PALLET - L. SUPPORT	2	
PALLET - RIVET MACH.	2	
PALLET - LEG BIN	2	

PARTS/OBJECTS:

EQUIPMENT:

PALLET - ANGLES
RIVET MACHINE - RIVET PINS
LEG BIN - LEGS

ι	5	1
C	X	2
	_)

FASTEN WITH RIVETER RIVET 2 LEGS TO CENTER SUPPORT	107/1005/2						
1 PLACE 1ST LEG TO RIVETPINS AND LEFTSUPPORT							
A3 BO G1 A1 BO F3 AO	1.0 80						
2 PLACE ANGLE FROM PALLET TO RIVETPINS F 2							
A3 B6 G1 A3 B0 F3 A0	2.0 320						
3 PUSH FOOTPEDAL FOR RIVETING LEG							
A1 BO G1 M1 X1 TO AO	1.0 40						
4 HOLDMOVE ANGLE FROM RIVETMACHINE TO RIGHTSUPPORT							
AO BO GO AI BO FI AO	1.0 20						
5 PLACE 2ND LEG AND ANGLE TO RIVETPINS							
A1 B0 G1 A1 B0 F3 A0	1.0 . 60						
8 PUSH FOOTPEDAL FOR RIVETING LEG	A PUBL FOOTPEDAL FOR RIVETING LEG						
AL BO GI HI XI TO AO	1.0 40						
7 HOLDHOVE LEG ASSEMBLY TO FINBIN							
AO BO GO A3 BO P1 AO	1.0 40						
	,						
TOTAL TMU	600						

MANUAL HANDLING						
ACTIVITY	SEQUENCE MODEL	SUB-ACTIVITIES				
GENERAL MOVE	ABGABPA	A - ACTION DISTANCE B - BODY MOTION G - GAIN CONTROL P - PLACE				
CONTROLLED MOVE	ABGMXIA	M - MOVE CONTROLLED X - PROCESS TIME I - ALIGN				
TOOL USE	ABGABP ABPA	F - FASTEN L - LOOSEN M - MEASURE R - RECORD S - SURFACE TREAT T - THINK				

: :

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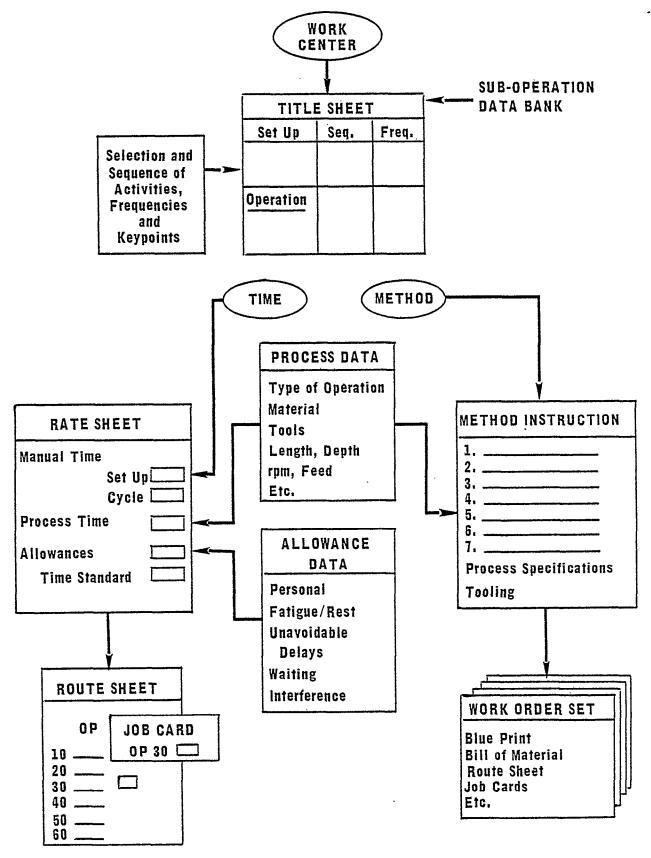
MOST® COMPUTER SYSTEMS FILING PROGRAM CATEGORIES FOR SUB-OPERATION DATA UNITS

	•	ACTIVITY(IES)	EXAMPLE EXCHANGE
C A M T	•	OBJECT(S)/COMPONENT(S) in/on/for	WORKPIECE in
M T A E J G O O R R	•	EQUIPMENT/PRODUCT with	3-JAW CHUCK
I E S	•	TOOL(S) from/to/at	T-WRENCH at
-	•	LOCATION	ENGINE LATHE #341
S U P P	•	PER unit	PER part
P LEMENTA NTARY	•	OCCURRENCE FREQUENCY GROUP	OFG 2
	•	DATE	11/7/77
	•	SPECIAL USER CATEGORY(IES)	(APPLICATOR, PLANT, ETC.)
	•	CONDITIONS	(RESTRICTIONS, SPECIAL APPLICATIONS, ETC.)

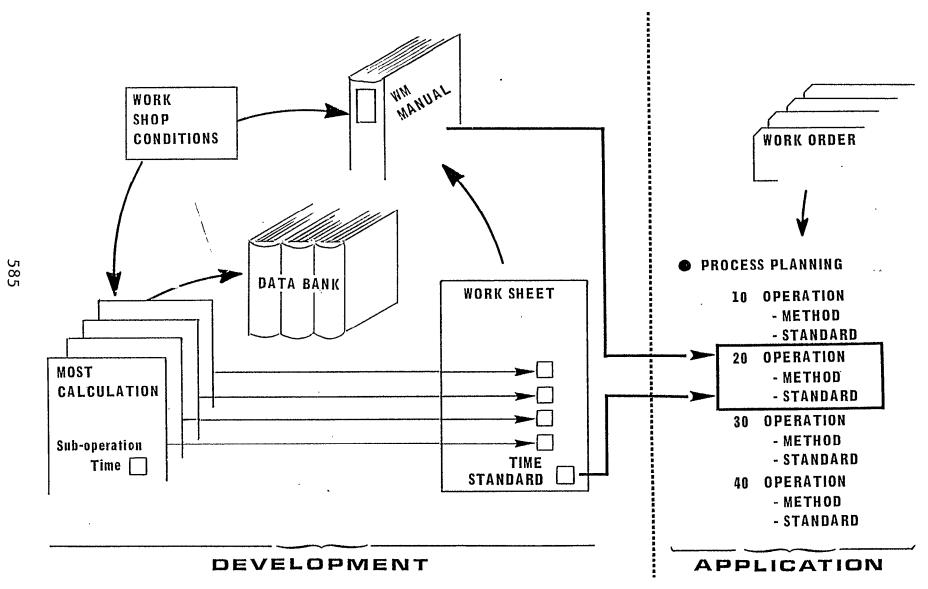
MOST" COMPUTER SYSTEMS FILING CATEGORIES FOR TIME STANDARDS

- PRODUCT/SUBASSEMBLY/PART NUMBER
- PRODUCT/SUBASSEMBLY/PART NAME
- COMPONENT CLASSIFICATION NUMBER
- PLANT NUMBER
- DEPARTMENT NUMBER
- COST CENTER NUMBER
- WORK CENTER NUMBER
- BILL OF MATERIAL NUMBER
- ROUTE SHEET NUMBER
- OPERATION NUMBER
- OPERATION NAME

PROCEDURE FOR ESTABLISHING METHODS AND TIME STANDARDS

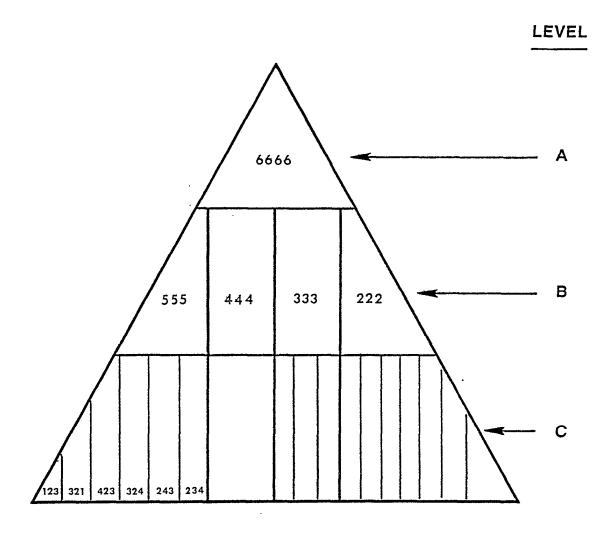


PROCEDURE FOR DEVELOPMENT & APPLICATION OF STANDARDS



SHIPBUILDING

MOST@ APPLICATION LEVELS



- A INDIVIDUAL STANDARDS COMBINED FOR WORK PACKAGE

 APPLICATION APPEAR ON THE STANDARDS CALCULATION

 SHEET
- B FINAL COMBINED MOST ANALYSES
- C INDIVIDUAL OR COMBINED MOST ANALYSES

COMPUTER MOST APPLICATION SHEET FITTING

TITLE SHEET LOCATOR NUMBER 4321

MAJOR CATEGORY	NO.	DESCRIPTION	PER	LOCATER NO.
RINGS	1 2	INSTALL REINFORCEMENT RING MAKE-UP REINFORCEMENT RING	RING RING	6666 7777
	3			
PLATES	4	MAKE-UP FACE PLATE TO WEB OR SECTION PART	FOOT	9999
	5		 	
	6.	***************************************		^ <u></u>
	7	-		
	8			
	erezago-e			

LEVEL

Ø		LN	6666 555	COMB SUB-OPERATION MAKE-UP RING	FR 1
0	COMB SUB- OPERATIONS		444 333 222	GRIND INSTALL RING GRIND	1 1 4
0		LN [555 123	MAKE-UP RING MOVE	FR 1
\mathbf{O}	COMB SUB-		321 423 324	MEASURE FIT TACK	2 4 4
	OPERATIONS	l L	243 234	INSPECT ASIDE	2 1

WHY SHOULD YOU USE MOST COMPUTER SYSTEMS?

- (1) BECAUSE MOST@ COMPUTER SYSTEMS CAN:
 - PROVIDE YOU WITH ACCURATE AND CONSISTENT WELL-DOCUMENTED
 TIME STANDARDS AND METHODS DESCRIPTIONS
 - PROVIDE YOU WITH REALISTIC TIME STANDARDS FOR COSTING,
 SCHEDULING, MANPOWER PLANNING, PERFORMANCE CONTROL, WAGE
 INCENTIVES, ETC., E.G., THE BASIS FOR YOUR "MANUFACTURING
 INFORMATION SYSTEM"
 - PROVIDE YOU WITH EASY-TO-READ METHOD INSTRUCTIONS FOR YOUR OPERATORS, ROUTE OR PROCESS SHEETS AS WELL AS WORKPLACE LAYOUTS AND DATA
 - PROVIDE YOU WITH AN EXTREMELY COST EFFECTIVE SET OF LABOR TIME STANDARDS WITH SAVINGS OF:

25% - DEVELOPMENT

75% - APPLICATION

90% - MAINTENANCE

COMPARED TO A MANUAL APPLICATION

- PROVIDE THE BASIS FOR A COMPREHENSIVE INCENTIVE CORRECTION
 PROGRAM WITHIN REASONABLE TIME AND COST
- PROVIDE YOUR UNION AND/OR WORKER REPRESENTATIVES WITH FULL KNOWLEDGE AND PROPER APPLICATION EXPERIENCE TO ENHANCE THEIR UNDERSTANDING AND INVOLVEMENT IN THE IMPLEMENTATION
- PROVIDE THE OPPORTUNITY FOR EITHER A COMPUTERIZED OR A MANUAL APPLICATION ALIKE
- PROVIDE A UNIFORM APPLICATION IN MULTI-PLANT ORGANIZATIONS AS A RESULT OF YOUR 'CENTRAL COORDINATION AND INSTANT INTERCHANGE-ABILITY OF COMPUTER STORED DATA

WHY SHOULD YOU USE MOST® COMPUTER SYSTEMS?

(2) BECAUSE YOU CAN:

- PRE-SET COMPLETE ENGINEERED TIME STANDARDS INCLUDING MANUAL,
 PROCESS AND ALLOWANCE TIMES AND KEEP THESE STANDARDS UP-TODATE WITH A MINIMUM OF EFFORT
- DOCUMENT ALL YOUR WORKSHOP CONDITIONS AND DATA FOR RAPID AND NEAT PRINTING AND UPDATING TO BE USED FOR INSTRUCTIONS AND REFERENCING AS WELL AS THE BASIS FOR FURTHER COMPANY-WIDE DEVELOPMENTS
- ADAPT PROGRAM OUTPUT FORMATS TO YOUR PRESENT ESTABLISHED PROCEDURES AND ROUTINES
- SIMULATE POSSIBLE PRODUCTIVITY IMPROVEMENT OPPORTUNITIES IN YOUR MANUFACTURING AREAS, A KEY TASK FOR YOUR INDUSTRIAL ENGINEERS
- INCREASE YOUR INDUSTRIAL ENGINEERS' OUTPUT AND PRODUCTIVITY AS WELL AS IMPROVE THE QUALITY OF THEIR WORK
- ATTRACT NEW AND QUALIFIED INDUSTRIAL ENGINEERING 'CAPACITY AS WELL AS KEEP YOUR COMPETENT INDUSTRIAL ENGINEERING PERSONNEL
- INCORPORATE MODERN COMPUTER TECHNOLOGY IN YOUR INDUSTRIAL ENGINEERING DEPARTMENT WITHOUT REQUIRING SOPHISTICATED COMPUTER SKILLS FROM THE USERS
- INSTALL A DEDICATED MINI-COMPUTER IN YOUR INDUSTRIAL ENGINEERING DEPARTMENT FOR DIRECT ON-LINE ACCESS AND INTERFACE THE OUTPUT OF COMPLETE TIME STANDARDS WITH EXISTING SOFTWARE PROGRAMS ON YOUR MAIN FRAME COMPUTER
- UTILIZE A VARIETY OF ADDITIONAL PROGRAM FEATURES THAT WILL AD-VANCE YOUR INDUSTRIAL ENGINEERING AND IMPROVE YOUR OVERALL PRODUCTION PLANNING AND CONTROL

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